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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/469,190

12/21/1999

KATSUHIKO HIEDA

04329.2210

4681

22852

7590

11/03/2003

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WASHINGTON, DC 20005

EXAMINER

VU, HUNG K

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 11/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/469,190

Applicant(s)

HIEDA ET AL.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 15 and 17-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-10, 15, 17, 18 and 20-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1 A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on 08/11/03 has been entered. An action on the RCE follows.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 19 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation (a lower electrode having a side and upper surface, wherein a surface area of the side being larger than a surface area of the upper surface) is not supported by the original specification and/or drawings.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 19, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 102(b) as being anticipated by Kashihara et al. (PN 5,567,964, of record).

Kashihara et al. discloses, as shown in Figure 14, a semiconductor device comprising,

a semiconductor substrate (31);

a conductive plug (43a) formed on the semiconductor substrate;

a lower electrode (1) formed in contact with the conductor plug and having a side and upper surface;

a capacitor insulating film (11d) formed on a side of the lower electrode;

an upper electrode (5) formed above the lower electrode via the capacitor insulating film,

the capacitor insulating film (11d) being formed above a top surface of the lower electrode via a second insulating film (3) different from the capacitor insulating film (11d). Note Col. 17, lines 29-46 of Kashiwara et al..

4. Claim 19, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 102(e) as being anticipated by Yunogami et al. (PN 6,451,665).

Yunogami et al. discloses, as shown in Figures 9 – 10(b) and 15 – 31(d), a semiconductor device comprising,

a semiconductor substrate (1);

a conductive plug (49) formed on the semiconductor substrate;

a lower electrode (51) formed in contact with the conductor plug and having a side and upper surface;

a capacitor insulating film (53) formed on a side of the lower electrode;

an upper electrode (54) formed above the lower electrode via the capacitor insulating film,

the capacitor insulating film (53) being formed above a top surface of the lower electrode via a second insulating film (52) different from the capacitor insulating film (53). Note Col. 12, line 22 – Col. 13, line 57 of Yunogami et al..

Response to Arguments

5. Applicants' arguments filed 08/11/03 have been fully considered but they are not persuasive.

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It is argued, at pages 2-3 and 5 of the Remarks, that the specification, p. 27, l. 20 to p. 28, l. 4, describes the claimed invention. This argument is not convincing because this paragraph describes only for the embodiment 1. The specification, p. 32, lines 3 – 6, only describes in general that “FIGS. 8A and 8B, the portions the same as those shown in FIGS. 1A and 1B are identified by the same reference numerals”. This does not necessary mean that the same elements must have the same dimensions (thickness, width, length, etc.). In particular, as described in p. 33, line 25 to p. 34, line 12, the portion of the storage node electrode 27 is etched back by about 50 nm and then the silicon nitride layer 121 is formed on the storage electrode 27. As the result, a side of the storage electrode will be decreased and that the surface area of the side will also be decreased. The specification does not state a surface area of the side being larger than a surface area of the upper surface after the storage node is etched back.

Applicants argued that despite etch back of storage node electrode 27, the side surface area can still be larger than the top when accounting for the depth dimension into the page. This argument is not convincing because, as shown in Figures 8A and 8B of the present invention, the surface area of top is still larger than the surface area of the side (since the length is always greater than the height and the depth is in common, the surface area of the top is always greater than that of the side).

It is argued, at page 4 of the Remarks, that Kashihara et al. does not disclose the lower electrode having side and upper surfaces, a surface area of the side being larger than a surface area of the upper surface. This argument is not convincing because the limitation (a surface area of the side

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being larger than a surface area of the upper surface) is not support by the specification and/or drawings.

It is argued, at pages 4-6 of the Remarks, that Kashihara et al. does not disclose the capacitor insulating layer being formed above a top surface of the lower electrode layer 1 via a second insulating film different from the capacitor insulating film. This argument is not convincing because Kashihara et al. teaches, as shown in Figure 14, the capacitor insulating layer (11d) being formed above a top surface of the lower electrode layer (1) via a second insulating film (3) different from the capacitor insulating film (11d). Note that Kashihara et al. teaches, at Col. 17, lines 29-46, the material of film (11d) comprising silicon nitride film, a silicon oxide film, ZrO_2 , TiO_2 or Ta_2O_5 . Also, at Col. 14, lines 57-59, Kashihara et al. teaches the material of film (3) comprising BST, ST or PZT. Also note that any insulating film forms between the lower electrode layer and the upper electrode layer is considered as the capacitor insulating film.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

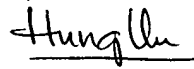
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

October 30, 2003

A handwritten signature in cursive script, appearing to read "Hung Vu", written over a horizontal line.

Hung Vu

Patent Examiner